



FDG6331L

# FDG6331L

## Integrated Load Switch

### General Description

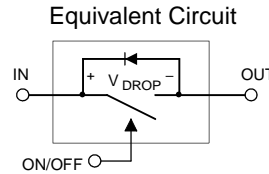
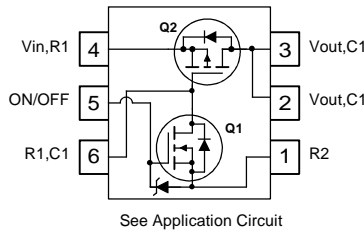
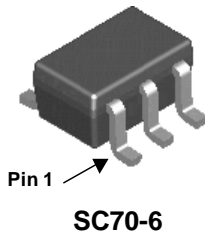
This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 0.8A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) that drives a large P-Channel power MOSFET (Q2) in one tiny SC70-6 package.

### Applications

- Power management
- Load switch

### Features

- -0.8 A, -8 V.  $R_{DS(ON)} = 260\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$   
 $R_{DS(ON)} = 330\text{ m}\Omega @ V_{GS} = -2.5\text{ V}$   
 $R_{DS(ON)} = 450\text{ m}\Omega @ V_{GS} = -1.8\text{ V}$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6KV Human body model)
- High performance trench technology for extremely low  $R_{DS(ON)}$
- Compact industry standard SC70-6 surface mount package



### Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V <sub>IN</sub>	Gate-Source Voltage (Q2)	± 8	V
V <sub>ON/OFF</sub>	Gate-Source Voltage (Q1)	-0.5 to 8	V
I <sub>Load</sub>	Load Current – Continuous (Note 2)	0.8	A
	– Pulsed (Note 2)	2.4	
P <sub>D</sub>	Maximum Power Dissipation (Note 1)	0.3	W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C

### Thermal Characteristics

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 1a)	415	°C/W
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### Package Marking and Ordering Information

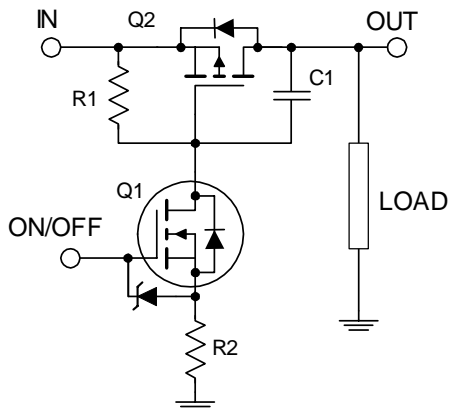
Device Marking	Device	Reel Size	Tape width	Quantity
.31	FDG6331L	7"	8mm	3000 units

**Electrical Characteristics** $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{IN}$	Vin Breakdown Voltage	$V_{ON/OFF} = 0\text{ V}, I_D = -250\ \mu\text{A}$	8			V
$I_{Load}$	Zero Gate Voltage Drain Current	$V_{IN} = -6.4\text{ V}, V_{ON/OFF} = 0\text{ V}$			-1	$\mu\text{A}$
$I_{FL}$	Leakage Current, Forward	$V_{ON/OFF} = 0\text{ V}, V_{IN} = 8\text{ V}$			100	nA
$I_{RL}$	Leakage Current, Reverse	$V_{ON/OFF} = 0\text{ V}, V_{IN} = -8\text{ V}$			-100	nA
<b>On Characteristics (Note 2)</b>						
$V_{ON/OFF(th)}$	Gate Threshold Voltage	$V_{IN} = V_{ON/OFF}, I_D = -250\ \mu\text{A}$	0.4	0.9	1.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance (Q2)	$V_{IN} = 4.5\text{ V}, I_D = -0.8\text{ A}$		155	260	$\text{m}\Omega$
		$V_{IN} = 2.5\text{ V}, I_D = -0.7\text{ A}$		193	330	
		$V_{IN} = 1.8\text{ V}, I_D = -0.6\text{ A}$		248	450	
$R_{DS(on)}$	Static Drain-Source On-Resistance (Q1)	$V_{IN} = 4.5\text{ V}, I_D = 0.4\text{ A}$		310	400	$\text{m}\Omega$
		$V_{IN} = 2.7\text{ V}, I_D = 0.2\text{ A}$		380	500	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current				-0.25	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{ON/OFF} = 0\text{ V}, I_S = -0.25\text{ A (Note 2)}$			-1.2	V

**Notes:**

- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta JA}$  is determined by the user's board design.
- Pulse Test: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2.0%.

**FDG6331L Load Switch Application Circuit****External Component Recommendation:**

For additional in-rush current control, R2 and C1 can be added. For more information, see application note AN1030.

Typical Characteristics

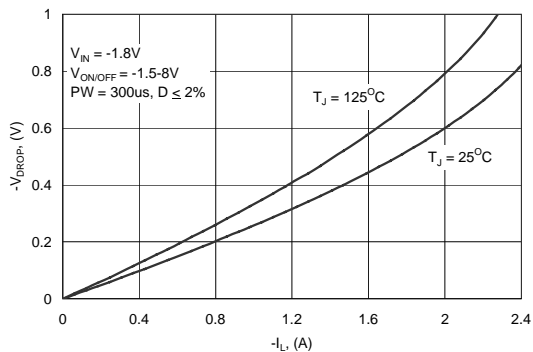


Figure 1. Conduction Voltage Drop Variation with Load Current.

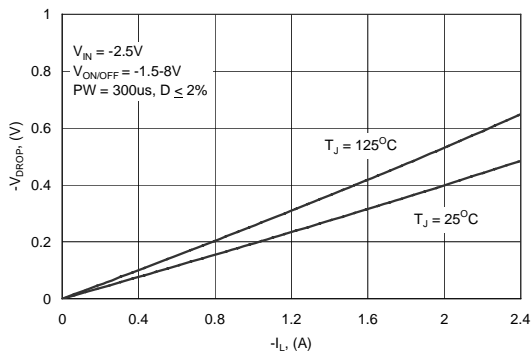


Figure 2. Conduction Voltage Drop Variation with Load Current.

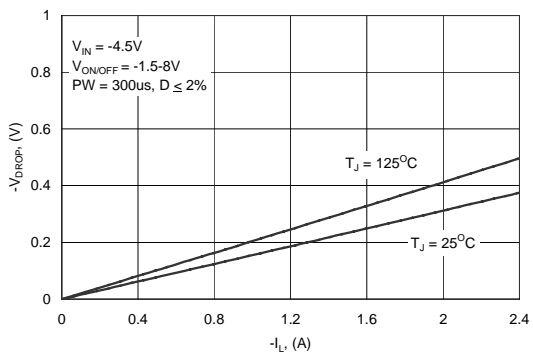


Figure 3. Conduction Voltage Drop Variation with Load Current.

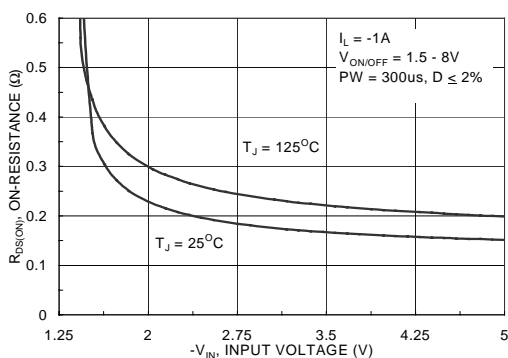
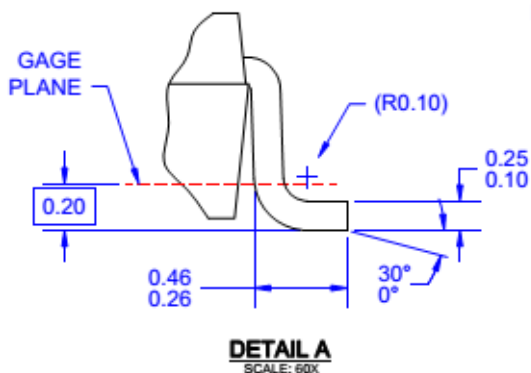
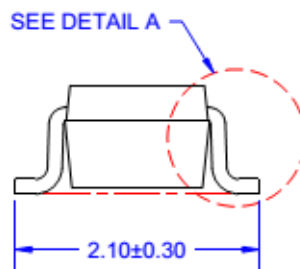
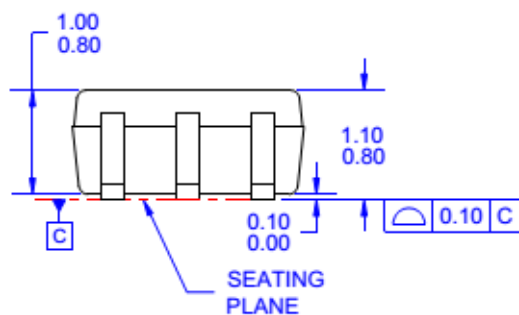
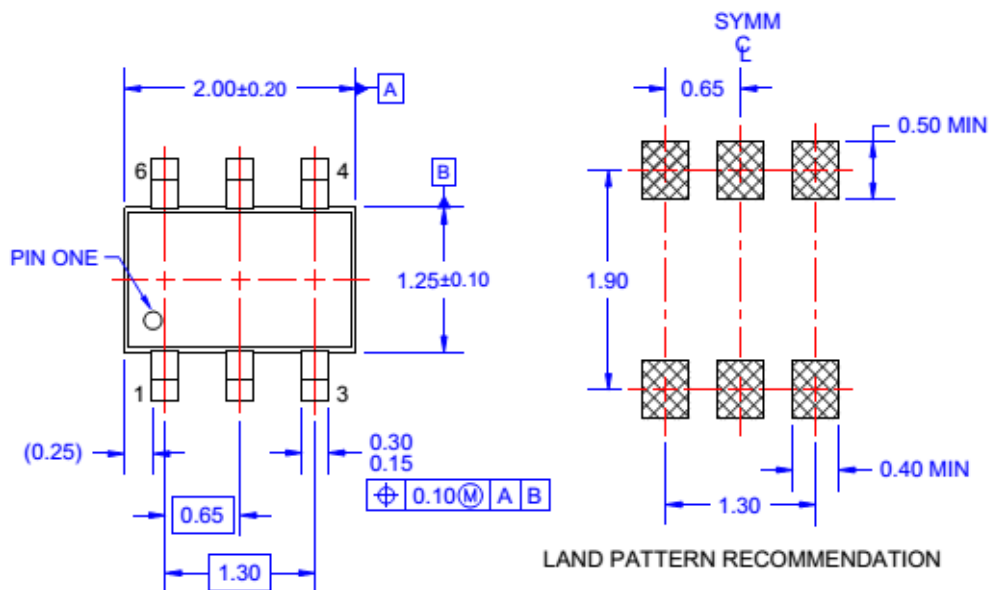


Figure 4. On-Resistance Variation With Input Voltage

## Dimensional Outline and Pad Layout



### NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-88, 1996.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- D) DRAWING FILENAME: MKT-MAA06AREV6

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| BitSiC™                  | GreenBridge™                                    | PowerXST™                             | TinyCalc™        |
| Build it Now™            | Green FPS™                                      | Programmable Active Droop™            | TinyLogic®       |
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|                          | MicroPak2™                                      | SPM®                                  | Ultra FRFET™     |
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| FACT®                    | MTi®  | SuperSOT™-6                           | VoltagePlus™     |
| FAST®                    | MTx®  | SuperSOT™-8                           | XST™             |
| FastvCore™               | MVN®  | SupreMOS®                             | Xsens™           |
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